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ALEXANDRIA, VIRGINIA 22313

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OBLON
SPIVAK
McCLELLAND
MAIER & NEUSTADT
P.C.

ATTORNEYS AT LAW

RE: Application Serial No.: 09/909,898
Applicants: Yoshio SUGAYA, et al.
Filing Date: July 23, 2001
For: ANION EXCHANGE MEMBRANE, PROCESS FOR
ITS PRODUCTION AND SOLUTION TREATING
APPARATUS
Group Art Unit: 1713
Examiner: Zitomer

SIR:

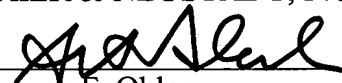
Attached hereto for filing are the following papers:

Appeal Brief w/In re Lee, 61 USPQ2d 1430 (in triplicate)

Our check in the amount of **320.00** is attached covering any required fees. In the event any variance exists between the amount enclosed and the Patent Office charges for filing the above-noted documents, including any fees required under 37 C.F.R. 1.136 for any necessary Extension of Time to make the filing of the attached documents timely, please charge or credit the difference to our Deposit Account No. 15-0030. Further, if these papers are not considered timely filed, then a petition is hereby made under 37 C.F.R. 1.136 for the necessary extension of time. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.


Norman F. Oblon

Registration No. 24,618



22850

(703) 413-3000 (phone)
(703) 413-2220 (fax)

Samuel H. Blech
Registration No. 32,082

DOCKET NO.: 211758US0



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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :

YOSHIO SUGAYA, ET AL.

: EXAMINER: ZITOMER, F.

SERIAL NO: 09/909,898 :

FILED: JULY 23, 2001

: GROUP ART UNIT: 1713

FOR: ANION EXCHANGE MEMBRANE,
PROCESS FOR ITS PRODUCTION
AND SOLUTION TREATING
APPARATUS

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

I. Real Party Interest

The real party in interest is Asahi Glass Company, Ltd., Tokyo, JAPAN, as recorded on September 12, 2001 at reel/frame 012152/0516.

II. Related Appeals and Interferences

No related appeals and interferences are known to Appellants, Appellants' legal representative, or assignee which will directly affect or be directed affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of the Claims

This is an appeal from the final rejection of Claims 1-12, all of the claims in the case.

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IV. Status of Response Under 37 C.F.R. § 1.116

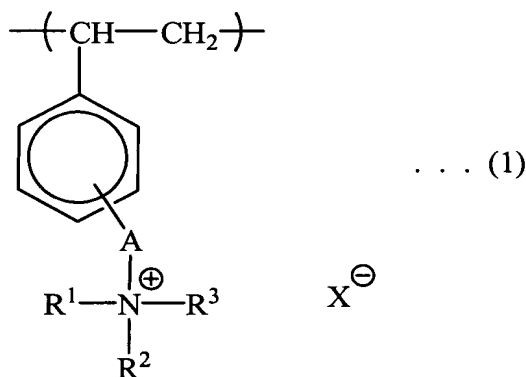
The response under 37 C.F.R. § 1.116 filed January 15, 2003 was considered by the Examiner, as note the Advisory Action of February 12, 2003, it not amending the claims, but did not persuade the Examiner to allow the claims.

V. The Appealed Claims

A copy of the appealed claims appears as an Appendix to this Appeal Brief.

VI. Summary of the Invention

The invention relates to an anion exchange membrane comprising a resin phase which contains from 20 to 96 mass% of a polymer having repeating units represented by the following formula (1):



wherein A is a C₃₋₈ alkylene group or an alkyleneoxyalkyl group having a total carbon number of from 4 to 9, each of R¹, R² and R³ is a hydrogen atom, a C₁₋₆ alkyl group or a hydroxyalkyl group, and X⁻ is an anion, and wherein any hydrogen atom bonded to the benzene ring may be substituted by an alkyl group or a halogen atom, and from 4 to 80

mass% of a thermoplastic polymer having no ion exchange groups, mixed substantially uniformly.

Claim 1 finds basis in original Claim 1 and at page 3, line 13 to page 4, and page 5, lines 7-14 of the specification.

Claims 2-12 are original claims. Specifically, the additional preferred feature of Claim 2 is disclosed at page 10, lines 1-4 of the specification.

The preferred features of Claims 3 and 4 are disclosed at page 13, lines 1-4 and page 15, lines 1-7 of the specification.

The process, as defined by Claim 5, finds basis at page 4, lines 5-25 of the specification.

Claim 6 finds basis at page 5, lines 1-7 and Claim 9 finds basis at page 12, line 4 to page 13, line 26 of the specification.

The preferred embodiment of Claim 10 is disclosed at page 14, lines 9-21 of the specification.

Claims 11 and 12 are directed to solution treating apparatuses, as disclosed in the paragraph bridging pages 16 and 17 of the specification.

VII. Issues of this Appeal

The rejections for adjudication by this appeal are under 35 U.S.C. § 103. Specifically, the following rejections under this Section of the Statute are made by the Examiner:

a. Claims 1-4, 11 and 12 as being unpatentable over Terada et al. (U.S. 5,759,373) taken with Tomoi et al. (U.S. 5,350,523).

b. Claims 5-9 as being unpatentable over the same references as applied under a., further in view of MacDonald (U.S. 5,045,171).

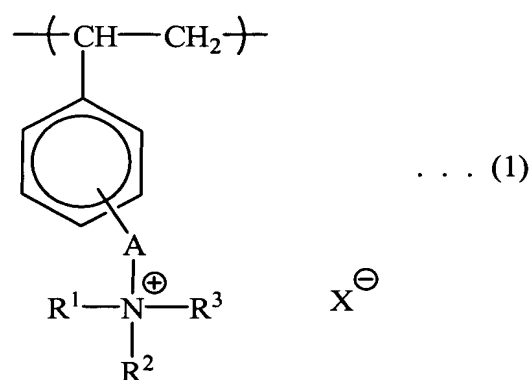
c. Claim 10 as being unpatentable over Terada et al., taken with Tomoi et al., and further in view of MacDonald, as applied to Claims 1-9, 11 and 12, and further in view of Akao, U.S. 4,876,129, or Osterholtz, U.S. 3,846,521, or Sata et al., U.S. 4,169,023, or Saad et al., U.S. 6,306,646, or Chau et al., U.S. 4,775,474.

VIII. Grouping of the Claims

It is submitted that each of the claims, separately and individually, defines a patentable invention. They do not stand or fall together, for reasons as will be pointed out below.

IX. Arguments in Traversal of the Rejection

The invention, as defined by Claim 1, relates to an anionic exchange membrane comprising a resin phase which contains from 20 to 96 mass% of a polymer having repeating units represented by the following formula (1):



wherein A is a C_{3-8} *alkylene* group or an alkyleneoxyalkyl group having a total carbon number of from 4 to 9, each of R^1 , R^2 and R^3 is a hydrogen atom, a C_{1-6} alkyl group or a hydroxyalkyl group, and X^- is an anion, and wherein any hydrogen atom bonded to the

benzene ring may be substituted by an alkyl group or a halogen atom, and from 4 to 80 mass% of a thermoplastic polymer having no ion exchange groups, *mixed substantially uniformly*.

As so specifically recited in Claim 1, the defined anion exchange resin and the thermoplastic polymer are "mixed substantially uniformly" in the membrane. This means, as so defined at page 5, lines 7-14 of the specification, that when the resin phase is observed by an optical microscope, the polymer of the formula (1) and the thermoplastic polymer having no ion exchange groups can not be distinguished, and phase separated structure containing phases having a size of more than 1 μm can not be observed. Such is achieved only by using the claimed process for its preparation, i.e., wherein a thermoplastic polymer having no ion exchange groups is mixed with a polymerizable component comprising a monomer of the formula (2), as defined in Claim 5, and the polymerizable monomer is then polymerized while mixed with such thermoplastic polymer, i.e., grafting of the polymerizable component onto the thermoplastic polymer can be presumed to take place. Such process is not disclosed by Terada et al.

The method of Terada et al. involves only mixing of preformed polymers, as note column 5, line 17 ff. In Terada et al., a heterogeneously mixed porous ion exchanger is obtained by mechanically mixing a powder of the polymer of the formula (1) and the thermoplastic polymer and forming the mixture into a sheet by e.g. hot pressing. An inferior membrane is obtained thereby, since deterioration of the selective permeability of ions due to an increase of the concentration of the electrolyte is substantial. If such membrane is used for a long period of time at a high temperature or in a solution having a composition which swells the resin, deterioration of the selective permeability of ions or deterioration of the selective permeability of ions or deterioration of the membrane strength takes place. Note page 5 of the specification.

The Examiner recognizes this basic distinction, but urges that patentability of a product rests with the actual product formed as opposed to the method by which it is formed, Terada et al. also teaching the use of a binder polymer solution, and that MacDonald remedies any possible inadequacy of Terada et al. to make obvious Applicants' discovery.

It is submitted that the position taken by the Examiner is not well taken. Specifically, the methods disclosed by Terada et al. at column 5, lines 17-30 involve only the making of a heterogeneous mixture of ion exchange resin and binder polymer, no substantially uniform mixing, as defined, being obtained thereby. When a binder polymer solution is employed by Terada et al., the polymer is disclosed only to be coated on the surface of the ion exchange resin particles (column 5, lines 22-23), the binder polymer not becoming substantially uniformly mixed with the anion exchange resin thereby, as is required and necessary in the claimed invention. Manifestly, on its face, a materially and significantly different product is obtained by the claimed process as compared to the product obtained by Terada et al.

Further, in any event, and most significantly, Terada et al. does not disclose an anion exchange membrane wherein the anion exchange resin is one as defined by the claims. As the polymer having an ion exchanging groups, as far as is relevant to the present invention, only polyvinylbenzyltrimethylammonium chloride is disclosed by Terada et al. (column 5, lines 4-5). In the present invention, on the other hand, in the claimed polymer A is a C₃₋₈ alkylene group or an alkyleneoxyalkyl group having a total carbon number of from 4 to 9. The Examiner recognizes this distinction and thus additionally relies on Tomoi et al. to assertedly further cure this deficiency.

It is submitted that such additional reliance on Tomoi et al. to make obvious Applicants' discovery is rebutted for the following reasons. Preliminarily, the fact that a different anion exchange resin mixed substantially uniformly with a thermoplastic polymer is known, as so disclosed by Tomoi et al., does not provide to the artisan any motivation or

reason for substituting such anion exchange resin for the anion exchanger of Tarada et al., no motivation or incentive therefor being present. Note In re Lee, 61 USPQ2d 1430. Only polyvinylbenzyltrimethylammonium chloride is disclosed by Tarada et al. as precursor for their anion exchange resin. No other anion exchange resins of this type are disclosed, only other significantly different anion exchange resins being taught by Tarada et al.

Further, and in any event, Tarada et al., not Tomoi et al., manifestly is the closest prior art, only this reference teaching a mixture, albeit heterogeneous, of an anion exchange resin and a polymer binder. This closest prior art, however, has been directly compared with and shown to result in a product of inferior properties and characteristics. Note Comparative Example 3 at page 20 of the specification. Tomoi et al. manifestly is not the closest prior art, it only disclosing the anion exchange resin, *per se*, not as a mixture with a binder polymer.

With regard to process Claims 5-9, the Examiner additionally relies on MacDonald. However, while MacDonald teaches a method of polymerizing a functional monomer together with a thermoplastic film forming polymer to prepare a membrane, no polymerizable monomer as required by the claims is disclosed by this reference. Here again, only a monomer of vinylbenzyltrialkylammonium chloride is, *inter alia*, disclosed as suitable. Note col. 4, line 55, of this reference. However, as pointed out and discussed above, a membrane obtained by the use of such polymerizable monomer results in a significantly and materially inferior product.

With regard to Claim 10, the Examiner additionally relies on various cited references assertedly teaching that “irradiating thermoplastic polymers with electron beams or gamma-rays to optimize properties such as crosslinking, diffusion, hydrophilicity, adhesion, permeability etc.” is known. However, these additionally relied upon references manifestly do not relate to an anion exchange resin membrane of the nature as claimed resulting in additional unobvious improvements, as note page 14, lines 9-18 of the specification. Such

irradiation additionally thus is unobvious even considering the teachings of these further references.

X. The Dependent Claims

Each of the dependent claims, separately and individually, defines a patentable invention, they not standing or falling together.

Specifically, with regard to Claim 2, the additional feature claimed therein that the thermoplastic polymer has an unsaturated bond ratio in its main chain of at most 3% is neither disclosed nor made obvious by the references. Such limitation, contributes to the superior properties and characteristics of the claimed anion exchange membrane, as so disclosed at page 10, lines 16-22 of the specification. Such is neither disclosed by, nor made obvious, by the references.

The additional limitations in Claims 3 and 4 also contribute to unobviously superior results, as disclosed at page 15, lines 1-15 of the specification. This advantageous results also are neither taught nor made obvious by the references.

Also, the specific process limitations of Claims 7-9, and particularly of Claim 10, further result in additional advantages. With regard to Claim 10, specifically note page 14, lines 9-21, irradiation with electron rays or γ -rays providing for improved adhesion between the porous substrate and the membrane.

As to Claims 11 and 12, a treating apparatus comprising the anion exchange membrane of the claimed invention evinces excellent alkali resistance and heat resistance, as so disclosed in the paragraph bridging pages 16 and 17 of the specification, such resulting in unobviously superior effects.

XI. Relief Requested

Withdrawal of the Examiner's rejection of the appealed Claims 1-12 thus is requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Norman F. Oblon
Attorney of Record
Registration No. 24,618

Samuel H. Blech
Registration No. 32,082



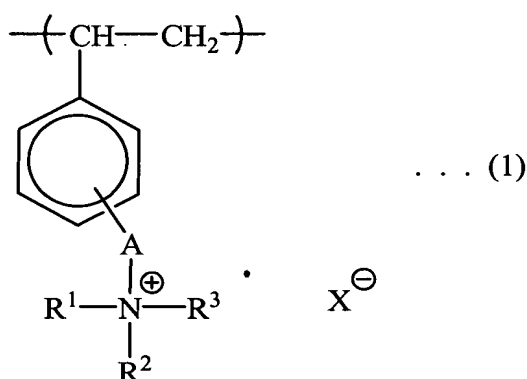
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Tel.: (703) 413-3000
Fax: (703) 413-2220
NFO/SHB/cja
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Appendix

The appealed claims read as follows:

1. An anion exchange membrane comprising a resin phase which contains from 20 to 96 mass% of a polymer having repeating units represented by the following formula (1):



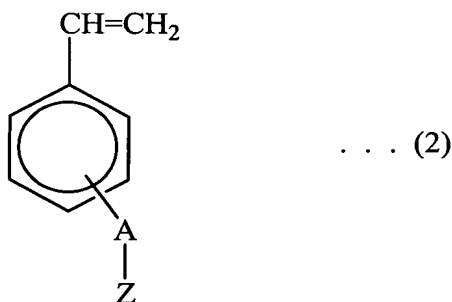
wherein A is a C₃₋₈ alkylene group or an alkyleneoxyalkyl group having a total carbon number of from 4 to 9, each of R¹, R² and R³ is a hydrogen atom, a C₁₋₆ alkyl group or a hydroxyalkyl group, and X⁻ is an anion, and wherein any hydrogen atom bonded to the benzene ring may be substituted by an alkyl group or a halogen atom, and from 4 to 80 mass% of a thermoplastic polymer having no ion exchange groups, mixed substantially uniformly.

2. The anion exchange membrane according to Claim 1, wherein the thermoplastic polymer having no ion exchange groups is a thermoplastic polymer having an unsaturated bond ratio in its main chain of at most 3%.

3. The anion exchange membrane according to Claim 1, which comprises the resin phase and a porous membrane-supporting material.

4. The anion exchange membrane according to Claim 3, wherein the polymer having repeating units represented by the formula (1) is penetrated in the porous membrane-supporting material, and the content of the repeating units represented by the formula (1) in the membrane-supporting material is from 0.05 to 0.7 time the content of such repeating units in the resin phase.

5. A process for producing an anion exchange membrane, which comprises mixing a thermoplastic polymer having no ion exchange groups with a polymerizable component comprising a monomer of the formula (2):



wherein A is a C₃₋₈ alkylene group or an alkyleneoxyalkyl group having a total carbon number of from 4 to 9, and Z is chlorine, bromine, iodine, a hydroxyl group, a tosyl group, a primary to tertiary amine, or a -NR¹R²R³ group, wherein each of R¹, R² and R³ is a hydrogen atom, a C₁₋₆ alkyl group or a hydroxyl group, and wherein any hydrogen atom bonded to the benzene ring may be substituted by an alkyl group or a halogen atom, or a mixture of the monomer of the formula (2) and a monomer copolymerizable therewith, and then polymerizing the polymerizable component.

6. The process for producing an anion exchange membrane according to Claim 5, wherein the monomer of the formula (2) is used in an amount of from 20 to 96 mass%, based on the total amount of the polymerizable component and the thermoplastic polymer having no ion exchange groups.

7. The process for producing an anion exchange membrane according to Claim 5, wherein the thermoplastic polymer is mixed with the polymerizable component by impregnating the polymerizable component to the membrane-form molded product of the thermoplastic polymer having no ion exchange groups.

8. The process for producing an anion exchange membrane according to Claim 5, wherein a solution obtained by mixing the thermoplastic polymer having no ion exchange groups with the polymerizable component, is formed into a membrane, and then, the polymerizable component is polymerized.

9. The process for producing an anion exchange membrane according to Claim 8, wherein the solution obtained by mixing the thermoplastic polymer having no ion exchange groups with the polymerizable component, is impregnated to a porous membrane-supporting material and formed into a membrane, and then, the polymerizable component is polymerized.

10. The process for producing an anion exchange membrane according to Claim 9, wherein the porous membrane-supporting material is irradiated with electron rays or γ -rays before or when the solution obtained by mixing the thermoplastic polymer having no ion exchange groups with the polymerizable component, is impregnated thereto.

11. A solution treating apparatus comprising an electrodialytic mechanism employing the anion exchange membrane as defined in Claim 1.

12. A solution treating apparatus comprising a diffusion dialytic mechanism employing the anion exchange membrane as defined in Claim 1.

In re Lee, 61 USPQ2d 1430 (CA FC 2002)

61 USPQ2D 1430
In re Lee

U.S. Court of Appeals Federal Circuit

No. 00-1158
Decided January 18, 2002

Headnotes

PATENTS

[1] Practice and procedure in Patent and Trademark Office — Board of Patent Appeals and Interferences — In general (§110.1101)

Patentability/Validity — Obviousness — Combining references (§115.0905)

Patentability/Validity — Obviousness — Evidence of (§115.0906)

Rejection of patent application for obviousness under 35 U.S.C. §103 must be based on evidence comprehended by language of that section, and search for and analysis of prior art includes evidence relevant to finding of whether there is teaching, motivation, or suggestion to select and combine references relied on as evidence of obviousness; factual inquiry whether to combine references must be thorough and searching, based on objective evidence of record, and Board of Patent Appeals and Interferences must explain reasons why one of ordinary skill in art would have been motivated to select references and to combine them to render claimed invention obvious.

[2] Patentability/Validity — Obviousness — Combining references (§115.0905)

JUDICIAL PRACTICE AND PROCEDURE

Procedure — Judicial review — Standard of review — Patents (§410.4607.09)

Board of Patent Appeals and Interferences improperly relied upon “common knowledge and common sense” of person of ordinary skill in art to find invention of patent application obvious over combination of two prior art references, since factual question of motivation to select and combine references is material to patentability, and could not be resolved on subjective belief and unknown authority, since deferential review of agency decisions under Administrative Procedure Act reinforces obligation of board to develop evidentiary basis for its findings, since board's rejection of need for any specific hint or suggestion in particular reference to support combination constituted omission of relevant factor required by precedent, and thus was both legal error and arbitrary agency action, since board's findings must extend to all material facts and be documented on record, and since “common knowledge and common sense” are not specialized knowledge and expertise of agency contemplated by APA, and may not be substituted for evidence, although they may be applied to analysis of evidence.

PATENTS

[3] Practice and procedure in Patent and Trademark Office — Board of Patent Appeals and Interferences — In general (§110.1101)

Patentability/Validity — Obviousness — Evidence of (§115.0906)

JUDICIAL PRACTICE AND PROCEDURE

Procedure — Judicial review — Standard of review — Patents (§410.4607.09)

Patent examiners and Board of Patent Appeals and Interferences, in relying on what they assert to be general knowledge to negate patentability on ground of obviousness, must articulate that knowledge and place it on record, since examiners and board are presumed

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to act from viewpoint of person of ordinary skill in art in finding relevant facts, assessing significance of prior art, and making ultimate determination of obviousness issue; failure to do so is not consistent with either effective administrative procedure or effective judicial review, and board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth rationale on which it relies.

[4] Procedure — Court of Appeals for the Federal Circuit (§410.03)

Procedure — Judicial review — Standard of review — Patents (§410.4607.09)

U.S. Court of Appeals for the Federal Circuit will not consider proposed alternative grounds for affirming decision of Board of Patent Appeals and Interferences rejecting patent application for obviousness, since alternative grounds were made at oral argument and constitute post hoc rationalization for agency action, consideration of which would deprive aggrieved party of fair opportunity to support its position.

Case History and Disposition

Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Patent application of Sang-Su Lee, serial no. 07/631,210, directed to method of automatically displaying functions of video display device and demonstrating how to select and adjust functions to facilitate user response. Applicant appeals from decision upholding rejection of all claims for obviousness, and from reaffirmation of that decision on reconsideration. Reversed and remanded.

Attorneys:

Richard H. Stern and Robert E. Bushnell, Washington, D.C., for Sang Su Lee.

Sidney O. Johnson Jr., associate solicitor, John M. Whealan, solicitor, and Raymond T. Chen, Maximilian R. Peterson, and Mark Nagumo, associate solicitors, Arlington, Va., for Director of U.S. Patent and Trademark Office.

Judge:

Before Newman, Clevenger, and Dyk, circuit judges.

Opinion Text

Opinion By:

Newman, J.

Sang-Su Lee appeals the decision of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office, rejecting all of the claims of Lee's patent application Serial No. 07/631,210 entitled "Self-Diagnosis and Sequential-Display Method of Every Function." 1 We vacate the Board's decision for failure to meet the adjudicative standards for review under the Administrative Procedure Act, and remand for further proceedings.

The Prosecution Record

Mr. Lee's patent application is directed to a method of automatically displaying the functions of a video display device and demonstrating how to select and adjust the functions in order to facilitate response by the user. The display and demonstration are achieved using computer-managed electronics, including pulse-width modulation and auto-fine-tuning

pulses, in accordance with procedures described in the specification. Claim 10 is representative:

10. A method for automatically displaying functions of a video display device, comprising:
determining if a demonstration mode is selected;
if said demonstration mode is selected, automatically entering a picture adjustment mode having a picture menu screen displaying a list of a plurality of picture functions; and
automatically demonstrating selection and adjustment of individual ones of said plurality of picture functions. The examiner rejected the claims on the ground of obviousness, citing the combination of two references: United States Patent No. 4,626,892 to Nortrup, and the Thunderchopper Helicopter Operations Handbook for a video game. The Nortrup reference describes a television set having a menu display by which the user can adjust various picture and audio functions; however, the Nortrup display does not include a demonstration of how to adjust the functions. The Thunderchopper Handbook describes the Thunderchopper game's video display as having a "demonstration mode" showing how to play the game; however, the Thunderchopper Handbook makes no mention of the adjustment of picture or audio functions. The examiner held that it

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would have been obvious to a person of ordinary skill to combine the teachings of these references to produce the Lee system.

Lee appealed to the Board, arguing that the Thunderchopper Handbook simply explained how to play the Thunderchopper game, and that the prior art provided no teaching or motivation or suggestion to combine this reference with Nortrup, or that such combination would produce the Lee invention. The Board held that it was not necessary to present a source of a teaching, suggestion, or motivation to combine these references or their teachings. The Board stated:

The conclusion of obviousness may be made from common knowledge and common sense of a person of ordinary skill in the art without any specific hint or suggestion in a particular reference. Board op. at 7. The Board did not explain the "common knowledge and common sense" on which it relied for its conclusion that "the combined teachings of Nortrup and Thunderchopper would have suggested the claimed invention to those of ordinary skill in the art."

Lee filed a request for reconsideration, to which the Board responded after five years. The Board reaffirmed its decision, stating that the Thunderchopper Handbook was "analogous art" because it was "from the same field of endeavor" as the Lee invention, and that the field of video games was "reasonably pertinent" to the problem of adjusting display functions because the Thunderchopper Handbook showed video demonstrations of the "features" of the game. On the matter of motivation to combine the Nortrup and Thunderchopper references, the Board stated that "we maintain the position that we stated in our prior decision" and that the Examiner's Answer provided "a well reasoned discussion of why there is sufficient motivation to combine the references." The Board did not state the examiner's reasoning, and review of the Examiner's Answer reveals that the examiner merely stated that both the Nortrup function menu and the Thunderchopper demonstration mode are program features

and that the Thunderchopper mode "is user-friendly" and it functions as a tutorial, and that it would have been obvious to combine them.

Lee had pressed the examiner during prosecution for some teaching, suggestion, or motivation in the prior art to select and combine the references that were relied on to show obviousness. The Examiner's Answer before the Board, plus a Supplemental Answer, stated that the combination of Thunderchopper with Nortrup "would have been obvious to one of ordinary skill in the art since the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software," and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial." The Board adopted the examiner's answer, stating "the examiner has provided a well reasoned discussion of these references and how the combination of these references meets the claim limitations." However, perhaps recognizing that the examiner had provided insufficient justification to support combining the Nortrup and Thunderchopper references, the Board held, as stated *supra*, that a "specific hint or suggestion" of motivation to combine was not required.

This appeal followed.

Judicial Review

Tribunals of the PTO are governed by the Administrative Procedure Act, and their rulings receive the same judicial deference as do tribunals of other administrative agencies. *Dickinson v. Zurko*, 527 U.S. 150, 50 USPQ2d 1930 (1999). Thus on appeal we review a PTO Board's findings and conclusions in accordance with the following criteria:

5 U.S.C. §706(2) The reviewing court shall—

(2) hold unlawful and set aside agency actions, findings, and conclusions found to be—
(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

* * * *

(E) unsupported by substantial evidence in a case subject to sections 556 and 557 of this title or otherwise reviewed on the record of an agency hearing provided by statute;

For judicial review to be meaningfully achieved within these strictures, the agency tribunal must present a full and reasoned explanation of its decision. The agency tribunal

Page 1433

must set forth its findings and the grounds thereof, as supported by the agency record, and explain its application of the law to the found facts. The Court has often explained:

The Administrative Procedure Act, which governs the proceedings of administrative agencies and related judicial review, establishes a scheme of "reasoned decisionmaking." Not only must an agency's decreed result be within the scope of its lawful authority, but the process by which it reaches that result must be logical and rational. *Allentown Mack Sales and Service, Inc. v. National Labor Relations Bd.*, 522 U.S. 359, 374 (1998) (citation omitted). This standard requires that the agency not only have reached a sound decision,

but have articulated the reasons for that decision. The reviewing court is thus enabled to perform meaningful review within the strictures of the APA, for the court will have a basis on which to determine "whether the decision was based on the relevant factors and whether there has been a clear error of judgment." *Citizens to Preserve Overton Park v. Volpe*, 401 U.S. 402, 416 (1971). Judicial review of a Board decision denying an application for patent is thus founded on the obligation of the agency to make the necessary findings and to provide an administrative record showing the evidence on which the findings are based, accompanied by the agency's reasoning in reaching its conclusions. *See In re Zurko*, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697(Fed. Cir. 2001) (review is on the administrative record); *In re Gartside*, 203 F.3d 1305, 1314, 53 USPQ2d 1769, 1774(Fed. Cir. 2000) (Board decision "must be justified within the four corners of the record").

[1] As applied to the determination of patentability *vel non* when the issue is obviousness, "it is fundamental that rejections under 35 U.S.C. §103 must be based on evidence comprehended by the language of that section." *In re Grasselli*, 713 F.2d 731, 739, 218 USPQ 769, 775(Fed. Cir. 1983). The essential factual evidence on the issue of obviousness is set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966) and extensive ensuing precedent. The patent examination process centers on prior art and the analysis thereof. When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. *See, e.g., McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008(Fed. Cir. 2001) ("the central question is whether there is reason to combine [the] references," a question of fact drawing on the *Graham* factors).

"The factual inquiry whether to combine references must be thorough and searching." *Id.* It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions, and cannot be dispensed with. *See, e.g., Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed. Cir. 2000) ("a showing of a suggestion, teaching, or motivation to combine the prior art references is an 'essential component of an obviousness holding'" (quoting *C.R. Bard, Inc., v. M3 Systems, Inc.*, 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232(Fed. Cir. 1998))); *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617(Fed. Cir. 1999) ("Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references."); *In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637(Fed. Cir. 1998) (there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant); *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600(Fed. Cir. 1988) ("teachings of references can be combined *only* if there is some suggestion or incentive to do so.") (emphasis in original) (quoting *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933(Fed. Cir. 1984)).

The need for specificity pervades this authority. *See, e.g., In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317(Fed. Cir. 2000) ("particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected

these components for combination in the manner claimed”); *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998) (“even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination.

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In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious.”); *In re Fritch*, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (the examiner can satisfy the burden of showing obviousness of the combination “only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references”).

[2] With respect to Lee's application, neither the examiner nor the Board adequately supported the selection and combination of the Nortrup and Thunderchopper references to render obvious that which Lee described. The examiner's conclusory statements that “the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software” and that “another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial” do not adequately address the issue of motivation to combine. This factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to “[use] that which the inventor taught against its teacher.” *W.L. Gore v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983). Thus the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion.

Deferential judicial review under the Administrative Procedure Act does not relieve the agency of its obligation to develop an evidentiary basis for its findings. To the contrary, the Administrative Procedure Act reinforces this obligation. *See, e.g., Motor Vehicle Manufacturers Ass'n v. State Farm Mutual Automobile Ins. Co.*, 463 U.S. 29, 43 (1983) (“the agency must examine the relevant data and articulate a satisfactory explanation for its action including a rational connection between the facts found and the choice made.”) (quoting *Burlington Truck Lines v. United States*, 371 U.S. 156, 168 (1962)); *Securities & Exchange Comm'n v. Chenery Corp.*, 318 U.S. 80, 94 (1943) (“The orderly function of the process of review requires that the grounds upon which the administrative agency acted are clearly disclosed and adequately sustained.”).

In its decision on Lee's patent application, the Board rejected the need for “any specific hint or suggestion in a particular reference” to support the combination of the Nortrup and Thunderchopper references. Omission of a relevant factor required by precedent is both legal error and arbitrary agency action. *See Motor Vehicle Manufacturers*, 463 U.S. at 43 (“an

agency rule would be arbitrary and capricious if the agency ... entirely failed to consider an important aspect of the problem"); *Mullins v. Department of Energy*, 50 F.3d 990, 992 (Fed. Cir. 1995) ("It is well established that agencies have a duty to provide reviewing courts with a sufficient explanation for their decisions so that those decisions may be judged against the relevant statutory standards, and that failure to provide such an explanation is grounds for striking down the action."). As discussed in *National Labor Relations Bd. v. Ashkenazy Property Mgt. Corp.*, 817 F.2d 74, 75 (9th Cir. 1987), an agency is "not free to refuse to follow circuit precedent."

The foundation of the principle of judicial deference to the rulings of agency tribunals is that the tribunal has specialized knowledge and expertise, such that when reasoned findings are made, a reviewing court may confidently defer to the agency's application of its knowledge in its area of expertise. Reasoned findings are critical to the performance of agency functions and judicial reliance on agency competence. See *Baltimore and Ohio R. R. Co. v. Aberdeen & Rockfish R. R. Co.*, 393 U.S. 87, 91-92 (1968) (absent reasoned findings based on substantial evidence effective review would become lost "in the haze of so-called expertise"). The "common knowledge and common sense" on which the Board relied in rejecting Lee's application are not the specialized knowledge and expertise contemplated by the Administrative Procedure Act. Conclusory statements such as those here provided do not fulfill the agency's obligation. This court explained in *Zurko*, 258 F.3d at 1385, 59 USPQ2d at 1697, that "deficiencies of the cited references cannot be remedied by

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the Board's general conclusions about what is 'basic knowledge' or 'common sense.'" The Board's findings must extend to all material facts and must be documented on the record, lest the "haze of so-called expertise" acquire insulation from accountability. "Common knowledge and common sense," even if assumed to derive from the agency's expertise, do not substitute for authority when the law requires authority. See *Allentown Mack*, 522 U.S. at 376 ("Because reasoned decisionmaking demands it, and because the systemic consequences of any other approach are unacceptable, the Board must be required to apply in fact the clearly understood legal standards that it enunciates in principle")

The case on which the Board relies for its departure from precedent, *In re Bozek*, 416 F.2d 1385, 163 USPQ 545 (CCPA 1969), indeed mentions "common knowledge and common sense," the CCPA stating that the phrase was used by the Solicitor to support the Board's conclusion of obviousness based on evidence in the prior art. *Bozek* did not hold that common knowledge and common sense are a substitute for evidence, but only that they may be applied to analysis of the evidence. *Bozek* did not hold that objective analysis, proper authority, and reasoned findings can be omitted from Board decisions. Nor does *Bozek*, after thirty-two years of isolation, outweigh the dozens of rulings of the Federal Circuit and the Court of Customs and Patent Appeals that determination of patentability must be based on evidence. This court has remarked, in *Smiths Industries Medical Systems, Inc. v. Vital Signs, Inc.*, 183 F.3d 1347, 1356, 51 USPQ2d 1415, 1421 (Fed. Cir. 1999), that *Bozek*'s reference to common knowledge "does not in and of itself make it so" absent evidence of such knowledge.

[3] The determination of patentability on the ground of unobviousness is ultimately one of judgment. In furtherance of the judgmental process, the patent examination procedure serves both to find, and to place on the official record, that which has been considered with respect to patentability. The patent examiner and the Board are deemed to have experience in the field of the invention; however, this experience, insofar as applied to the determination of patentability, must be applied from the viewpoint of "the person having ordinary skill in the art to which said subject matter pertains," the words of section 103. In finding the relevant facts, in assessing the significance of the prior art, and in making the ultimate determination of the issue of obviousness, the examiner and the Board are presumed to act from this viewpoint. Thus when they rely on what they assert to be general knowledge to negate patentability, that knowledge must be articulated and placed on the record. The failure to do so is not consistent with either effective administrative procedure or effective judicial review. The board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies.

Alternative Grounds

[4] At oral argument the PTO Solicitor proposed alternative grounds on which this court might affirm the Board's decision. However, as stated in *Burlington Truck Lines, Inc. v. United States*, 371 U.S. 156, 168 (1962), "courts may not accept appellate counsel's *post hoc* rationalization for agency action." Consideration by the appellate tribunal of new agency justifications deprives the aggrieved party of a fair opportunity to support its position; thus review of an administrative decision must be made on the grounds relied on by the agency. "If those grounds are inadequate or improper, the court is powerless to affirm the administrative action by substituting what it considers to be a more adequate or proper basis." *Securities & Exchange Comm'n v. Chenery Corp.*, 332 U.S. 194, 196 (1947). As reiterated in *Federal Election Comm'n v. Akins*, 524 U.S. 11, 25 (1998), "If a reviewing court agrees that the agency misinterpreted the law, it will set aside the agency's action and remand the case — even though the agency (like a new jury after a mistrial) might later, in the exercise of its lawful discretion, reach the same result for a different reason." Thus we decline to consider alternative grounds that might support the Board's decision.

Further Proceedings

Sound administrative procedure requires that the agency apply the law in accordance with statute and precedent. The agency tribunal must make findings of relevant facts, and present its reasoning in sufficient detail that the court may conduct meaningful review of the agency action. In *Radio-Television News Directors Ass'n v. FCC*, 184 F.3d 872 (D.C.

Cir. 1999) the court discussed the "fine line between agency reasoning that is 'so crippled as to be unlawful' and action that is potentially lawful but insufficiently or inappropriately explained," quoting from *Checkosky v. Securities & Exch. Comm'n*, 23 F.3d 452, 464 (D.C.

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Cir. 1994); the court explained that “[i]n the former circumstance, the court's practice is to vacate the agency's order, while in the latter the court frequently remands for further explanation (including discussion of the relevant factors and precedents) while withholding judgment on the lawfulness of the agency's proposed action.” *Id.* at 888. In this case the Board's analysis of the Lee invention does not comport with either the legal requirements for determination of obviousness or with the requirements of the Administrative Procedure Act that the agency tribunal set forth the findings and explanations needed for “reasoned decisionmaking.” Remand for these purposes is required. *See Overton Park*, 401 U.S. at 420-221 (remanding for further proceedings appropriate to the administrative process).

VACATED AND REMANDED

Footnotes

1 *Ex parte Lee*, No. 1994-1989 (Bd. Pat. App. & Int. Aug. 30, 1994; on reconsid'n Sept. 29, 1999).

**- End of Case -
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